solutions. With increasing concentrations of glucose (4–14 per cent), mannite (4–14 per cent), and Hellriegel's nutrient solution, there is a corresponding retardation of growth and increase of alcohol production. Low or high temperatures which retard growth also favor alcohol production, while at intermediate temperatures favoring growth alcohol production is decreased. The author therefore concludes that alcohol is produced by higher plants even under conditions of complete aeration, and correlates alcohol production with retardation of growth. It is immaterial whether the retardation of growth is brought about by unfavorable temperatures, high osmotic pressures, or other factors.—H. HASSELBRING.

Vegetation about Tucson, Arizona.—SHREVE[29] has compiled an excellent brief but comprehensive guide to the features of ecological interest in the vicinity of Tucson, Arizona. In addition to the better known desert and semi-desert areas immediately surrounding the city, he has included the more diversified conditions found in the adjacent Santa Catalina mountains. Starting with a desert formation at 900 meters, in which *Cereus giganteus*, *Opuntia* spp., *Echinocactus*, and *Fouquieria splendens* are conspicuous, the desert forms are found to disappear with increasing altitude, grasses and shrubs becoming more abundant, until at 1550 meters upon the north-facing slopes there is an open forest of such species as *Juniperus pachyphloea*, *Quercus oblongifolia*, *Q. Emoryi*, *Arctostaphylos pungens*, *Rhus trilobata*, and other woody forms. A further ascent of some 500 meters reveals forests of *Pinus arizonica* and smaller stands of other pines and oaks, with specimens of *Arbutus arizonica*. Finally, at 2350 meters this interesting succession finds its climax upon slopes forested with *Pseudotsuga*, *Abies concolor*, and *Pinus strobiformis*, with even more mesophytic forms along the water courses and in the undergrowth. A brief analysis is also presented of the factors which cause this diversity of vegetation. —GEO. D. FULLER.

Water reaction in a liverwort.—CANNON[30] reports experiments with a species of *Plagiochasma* found upon arid slopes of the Santa Catalina mountains, Arizona, at an altitude of 5000 feet, showing that the thalli are able to become air dry, involving the loss of over 70 per cent of their original weight; but upon being given water again they continued to grow without apparent injury. He has also demonstrated that these plants may endure such a desiccated condition for at least 25 days, and upon their restoration to moist conditions at once assume active growth. These experiments show clearly that this liverwort can withstand in nature conditions of extreme aridity.—GEO. D. FULLER.

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[29] SHREVE, FORREST, A guide to the salient physical and vegetational features of the vicinity of Tucson, Ariz. International Phytogeographic Excursion in Amer. pp. 11. 1913.

[30] CANNON, W. A., A note on the reversibility of the water reaction of a desert liverwort. Plant World **17**:261–265. 1914.